

WHAT IS CLAIMED IS:

1. A method of identifying mammalian pancreatic islet progenitor cells, the method comprising:

5 contacting a population of mammalian pancreatic cells with marker specific binding members for one or more markers selected from the group consisting of ErbB2, ErbB3, ErbB4 and Msx-2; and

detecting those cells that bind to said marker specific reagent;

wherein cells that bind to said marker specific reagent are identified as pancreatic islet progenitor cells.

10

2. The method of Claim 1, wherein said pancreatic islet progenitor cells are progenitors for insulin producing beta cells.

3. The method of Claim 2, wherein said marker is ErbB3.

15

4. The method of Claim 2, wherein said marker is Msx-2.

5. The method of Claim 2, wherein said method further comprises contacting said population of pancreatic cells with an insulin-specific reagent, and detecting those cells that do not bind to said insulin specific reagent.

20

6. The method of Claim 1, wherein said pancreatic islet progenitor cells are progenitors for glucagon producing alpha cells.

25

7. The method of Claim 6, wherein said marker is ErbB4.

8. The method of Claim 6, wherein said method further comprises contacting said population of pancreatic cells with a glucagon-specific reagent, and detecting those cells that do not bind to said glucagon specific reagent.

30

9. The method of Claim 1, wherein said population of pancreatic cells are pancreatic duct cells.

10. The method of Claim 9, wherein said population of pancreatic duct cells are from a fetal donor.

5 11. The method of Claim 9, wherein said population of pancreatic duct cells are from a neonatal donor.

12. The method of Claim 9, wherein said population of pancreatic duct cells are from an adult donor.

10

13. The method of Claim 9, wherein said pancreatic duct cells are human.

14. The method of Claim 9, wherein said pancreatic duct cells are mouse.

15

15. The method of Claim 1, wherein said marker-specific reagent is an antibody.

16. The method of Claim 15, wherein said antibody comprises a detectable label.

20

17. The method of Claim 15, wherein said detecting step comprises detection of said label by flow cytometry.

18. The method of Claim 17, further comprising the step of:
separating the cells in said population based on binding to said marker-specific reagent to provide a purified population of pancreatic progenitor cells.

25

19. An isolated population of pancreatic islet progenitor cells, wherein said cells are derived from pancreatic ducts, and are characterized as expressing at least one marker selected from the group consisting ErbB2, ErbB3, ErbB4 and Msx-2.

30

20. The isolated cell population of Claim 19, wherein said pancreatic islet progenitor cells are progenitors for insulin producing beta cells.

21. The isolated cell population of Claim 20, wherein said marker is ErbB3.

22. The isolated cell population of Claim 21, wherein said cells are further characterized as lacking detectable production of insulin.

5

23. The isolated cell population of Claim 19, wherein said pancreatic islet progenitor cells are progenitors for glucagon producing alpha cells.

24. The isolated cell population of Claim 23, wherein said marker is ErbB4.

10

25. The isolated cell population of Claim 24, wherein said cells are further characterized as lacking detectable production of glucagon.

26. The isolated cell population of Claim 19, wherein said cells are from a fetal donor.

15

27. The isolated cell population of Claim 19, wherein said cells are from a neonatal donor.

28. The isolated cell population of Claim 19, wherein said cells are from an adult donor.

20

29. The isolated cell population of Claim 19, wherein said cells are human.

30. The isolated cell population of Claim 19, wherein said cells are mouse.

25

31. A method of screening for genetic sequences specifically expressed in pancreatic islet progenitor cells, the method comprising:

isolating RNA from a cell population according to Claim 19,

generating a probe from said RNA,

screening a population of nucleic acids for hybridization to said probe.

30

32. The method of Claim 31, further comprising a comparison of the hybridization obtained between said pancreatic islet progenitor cells and a differentiated cell population.

5 33. The method of Claim 31, wherein said population of nucleic acids is represented in an array.

34. An *in vitro* cell culture, comprising:
a cell population according to Claim 19; and
cell culture medium.

10

35. A method of screening for agents that affect the growth or differentiation of pancreatic progenitor cells, the method comprising:

contacting the *in vitro* culture of Claim 34 with a candidate agent, and
determining the effect of said agent on the growth or differentiation of said pancreatic
15 progenitor cells.